

# M316K HANDOUT: EXTRA CREDIT PROJECT

On Friday we discussed some famous examples of irrational numbers. Along the way, we encountered many important ideas in the history of mathematics. Your mission, if you choose to accept it, is to research one of these ideas and write a short paper (no longer than 2 pages) about it. You may choose a topic from the list below, or come talk to me about a topic of your own. This assignment is worth three points to your total average at the end of the semester. You have until the last class day (Dec 5th) to get this to me.

## Topics

1. What are the complex numbers, and why are they useful?
2. What are some examples of the golden ratio in nature? Why does it appear in this context?
3. What does it mean to say that the real numbers are “complete”?
4. What is a transcendental number?
5. Why is  $e$  irrational? Or, (harder) why is  $\pi$  irrational?
6. What did I mean when I said that there are “more” real numbers than there are rational numbers? After all, both sets are infinite! (And no, I don't just mean that the rational numbers are contained in the real numbers.)